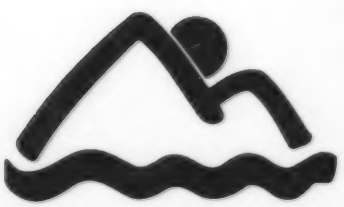
BC Environment

Beverage Container Recovery System

Private Sector Cost Estimates



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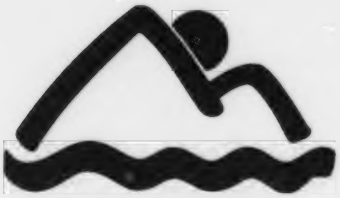

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Executive Summary

Container Corporation: The Financial, Management and Operating Implications of a Universal Beverage Container Recovery System

Municipal Waste Branch
Environmental Protection Division
B.C. Environment
November 1991

PREPARED FOR: CONTAINER CORPORATION

PREPARED BY: PEAT MARWICK STEVENSON & KELLOGG

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A. Introduction

A. Background

The reduction of municipal solid waste is an important issue both for government and the public. British Columbians use over 1.35 billion beverage containers each year, of which only approximately 40% are recovered through existing systems.

Glass and aluminum beer containers are recovered through an effective system operated by Pacific Brewers Distributors Limited (PBD). Current return rates exceed 95% for bottles and 90% for cans. Soft drink containers are returned to retailers for refilling or recycling. While the soft drink system is effective in comparison with other jurisdictions, it is not as effective as the recovery system for beer containers. Currently, 95% of refillable, over 80% of plastic and an estimated 60% of aluminum containers are recovered. A small percentage of other beverage containers is recovered through curbside recycling systems, which at present serve a minority of British Columbia households.

The B.C. Ministry of Environment is developing a coordinated approach to the recovery of all beverage containers, not just soft drinks and beer, which are presently covered by deposit legislation. In 1990, the Ministry commissioned a study of beverage container recovery options for the province. The study covered beer, wine, spirits, coolers, soft drink, fruit juice and milk. The authors of the study concluded that a deposit/refund system would be more effective in diverting beverage containers from the waste stream than would reliance on curbside recycling systems. The Ministry accepted this conclusion and we have not revisited the question. Since the publication of the study, producers of fruit juice and milk have lobbied to be excluded from any coordinated deposit/refund system, although Cabinet will be asked to reconsider the question.

Adding new beverage containers to existing recovery systems will create certain problems. Food retailers do not have the capacity to handle the return of hundreds of millions of new containers. The return of beverage containers to food stores is undesirable for health and hygiene reasons. Similarly liquor and beer and wine stores have inadequate capacity to handle the return of 50 million wine and spirit bottles each year with existing systems and infrastructure.

The creation of a universal, container return system leads to the concept of depots that specialize in, and are organized to handle, all types of containers. Depot systems exist in Alberta, Saskatchewan and many United States jurisdictions. A depot system has the advantage of providing return points for a variety of other recyclable materials. However, this study is restricted to the return of beverage containers.

The Ministry believes that an expanded deposit system will require the establishment of a cost effective depot network and a private sector system to administer deposits and recovery fees, and the marketing of recyclable materials. For want of a formal name, we have given the organizing authority a preliminary title of "Container Corporation."

2. The context of this report

Early in 1991 Peat Marwick Stevenson & Kellogg carried out a Phase I assignment to evaluate alternatives and to develop a recommended structure for the ownership and the control of Container Corporation. The model preferred by most stakeholders was a minimum cost, zero profit organization, controlled by "members." Members, as producers and distributors of beverages, take responsibility for their containers that are covered by comprehensive deposit/refund legislation. We recommended that control of Container Corporation be exercised by a board of directors partly elected on the basis of one member one vote, partly elected on the basis of votes weighted by recovery fees paid, and partly appointed by the Minister of Environment to represent the public interest. The exact structure of the Board needs to be finalized when the concept of a universal recovery system becomes reality.

In line with its philosophy that the beverage industry should be responsible for the recovery of beverage containers, the Ministry of Environment urged industry to cooperate in a project to determine the cost, management and other implications of the universal container recovery system. This report completes the assignment that resulted. Our ultimate client is Container Corporation Incorporated. Because this entity has not yet been established the two major breweries (Labatts and Molsons), the two major soft drink companies (Coca Cola and Gray Beverage), and the Liquor Distribution Branch (LDB) have advanced fees on behalf of Container Corporation. If, for any reason, Container Corporation is not established, the industry will be reimbursed by the Ministry of Environment.

The purpose of this phase of the assignment is to examine the marketing, operation, management and financial implications of establishing and operating a universal container recovery organization in British Columbia. This requirement includes the estimates of unit recovery costs per container, and total recovery costs summarized by individual container types and by payments to various elements in the network. Finally, we were to prepare an implementation plan to establish container corporation and to implement its operations.

During the conduct of this assignment we were guided principally by the five industry members representing Container Corporation. At the same time, we reported regularly to the Working Group on Beverage Containers, established and chaired by the Ministry of Environment. In addition to beer, soft drink and LDB representatives, the Group included representatives of the Ministry of Environment, the wine industry, the spirits industry, grocery distributors, fruit juice manufacturers, and dairy producers. Many members of the Group had diametrically opposed views. For example:

- The brewing industry, which operates its own efficient and effective system, is reluctant to join in a system that will increase its out-of-pocket costs, that is unlikely to increase recovery rates, and that might actually reduce recovery rates (at least temporarily).

- Soft drink manufacturers would prefer a blue box system, but if a universal system is to be implemented, would like all container types and beverages to be covered, including fruit juices that are in direct competition, but may be exempted from deposit legislation.

- Juice and milk producers have been promised exemption by Cabinet and will fight any attempt to include them. They prefer the blue box system of beverage container recovery.

- Wine and spirit producers would prefer to have their containers returned to their retailers (retail liquor stores).

- Soft drink retailers object to being included in the present recovery system on the grounds of cost and hygiene. They are not equipped to handle additional container types such as aseptic packs and paper milk cartons both from a space and health perspective.

- The Liquor Distribution Branch is evaluating the implications of relinquishing responsibility for receiving beer containers. Adding wine and spirit bottles to its responsibilities is a situation it would prefer to avoid because it lacks the necessary systems and infrastructure.

We were sensitive to these points of view which, however, do not affect the objective analysis of the implications of establishing a universal container recovery system, to recover a variety of container types.

3. We studied eight scenarios

For the reasons outlined above, a study of a single combination of beverages would be inadequate to cover all possible permutations. Accordingly, we studied eight scenarios, each of which represents a different combination of four beverage groups. The groups are:

1. Soft drinks, bottled water, fruit drinks (defined by the federal Food and Drug Act, and classified according to AC Neilsen statistics), and wine and spirits.

2. Beer, cider and coolers.

3. Fruit juice (defined by the federal Food and Drug Act and categorized by AC Neilsen statistics) and milk.

4. Beer, cider and coolers in non-refillable containers (for practical purposes this mean s all beer cans and import beer bottles.

The eight scenarios studies are the following:

A = 1 (Soft drinks, bottled water, fruit drink, wine and spirits).

B = 1 + 2 (Soft drinks, bottled water, fruit drink; wine and spirits; all beer, cider and coolers).

B1 = As for B, but glass beer containers are picked up by PBD from depots for sorting in the PBD system.

C = 1 + 3 (Soft drinks, bottled water, fruit drink; wine and spirits; juice and milk).

D = 1 + 2 + 3 (Soft drinks, bottled water, fruit drink; wine and spirits; all beer, cider, coolers; juice and milk).

D1 = As for D, but glass beer containers are picked up by PBD from depots for sorting in the PBD system.

E = 1 + 4 (Soft drinks, bottled water, fruit drink; wine and spirits; non-refillable beer, cider and coolers).

F = 1 + 3 + 4 (Soft drinks, bottled water, fruit drink; wine and spirits; juice and milk; non-refillable beer, cider and coolers).

The final combination may differ, depending on the resolution of the issues concerning fruit juice and non-recyclable containers. However, we believe that our conclusions are relevant to any likely combination of beverages.

4. The Working Group established preliminary criteria for the system

Working from the general to the specific, the criteria developed by the Working Group are:

- Facilitate the Ministry's policy mandate to promote and support the preferential 3R hierarchy of Reduce, Reuse, Recycle, with respect to container management.
- Minimize government involvement in the operations of Container Corporation.
- Vest lifecycle responsibility for beverage containers and their associated packaging with the producers or distributors, including true costs, which will have the effect of promoting environmentally-sound designs and container types.

- Maximize the recovery rate of beverage containers and thereby maximize the diversion of container waste from the landfill and litter streams.
- Maximize efficiency and effectiveness of the recovery system to keep shelf prices down.
- Ensure an efficient and quick return of refillables to producers.
- Ensure an equitable return of all container formats, reflecting true lifecycle costs.
- Ensure internalized cost segregation by container type so that efficiency is rewarded.
- Negotiate and develop long-term markets for recyclable container materials recovered by the system.
- Maximize revenue from recycled commodities.
- Provide employment opportunities for the handicapped.

B. Overview of the system

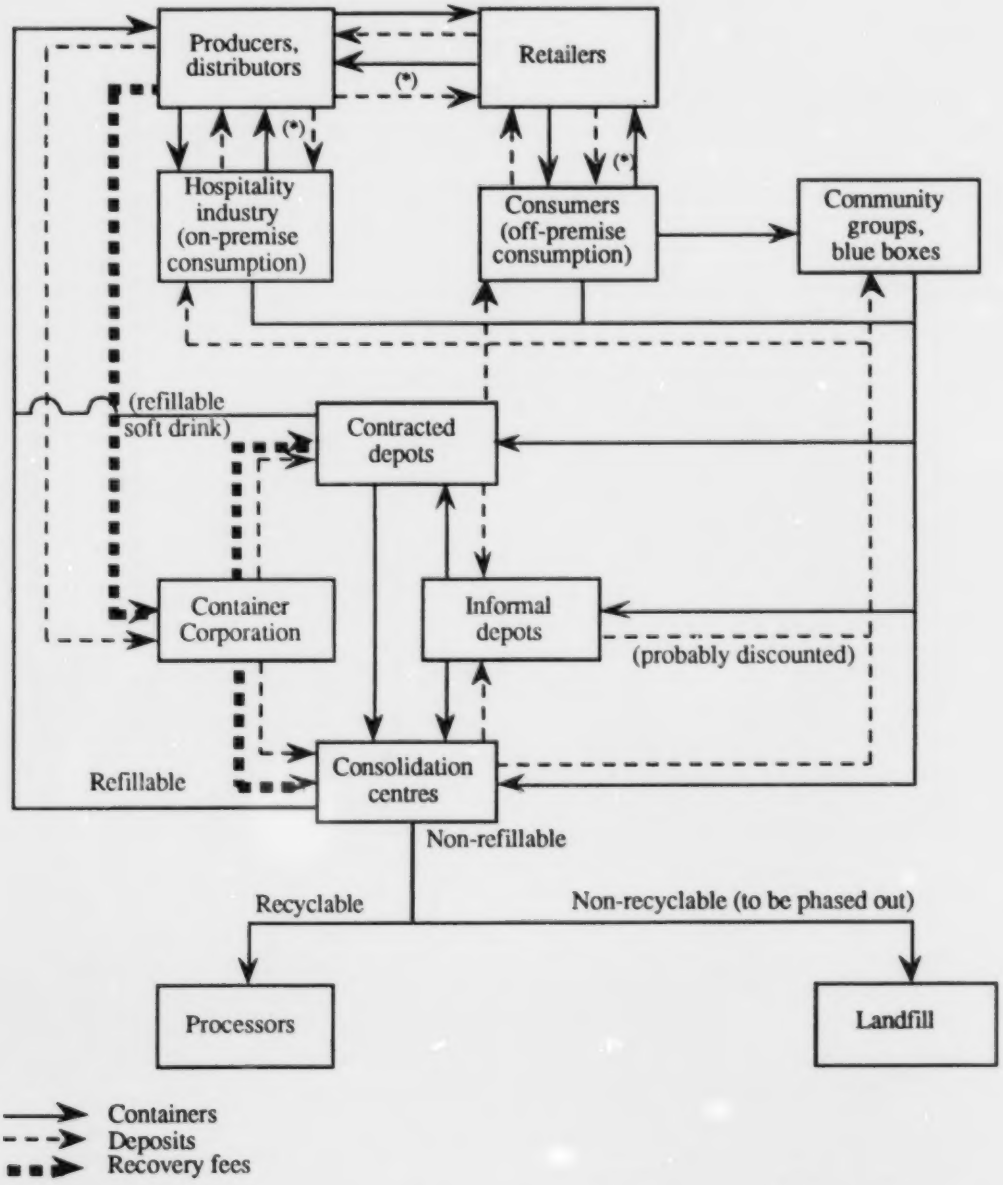
Exhibit 1 is a schematic diagram of a comprehensive container recovery network showing the major elements and the flows of containers, deposits and recovery fees.

The flow of containers starts with producers and distributors supplying retailers and the hospitality industry. In return for the full containers the producers and distributors receive legislated deposits. Sometime after the sale, producers and distributors covered by the legislation forward to Container Corporation the deposits that they have collected, and the recovery fees that the corporation has assessed as being required for the complete recovery of the empty containers.

Consumers buy beverages from retailers for off-premise consumption, paying a deposit as they receive the container. It is proposed that consumers continue to have the right to return beer containers to LRS for full refund in all scenarios. In some scenarios they may continue to return beer containers to the LDB. Consumers may choose to donate containers to community groups or to use blue box systems. As well, together with the hospitality industry they can return containers for full deposit to contracted depots or consolidation centres, or for a discounted deposit to an informal depot.

Contracted depots and consolidation centres have contracts with Container Corporation to receive deposits and handling fees. Informal depots have no contractual relationship with Container Corporation and must deliver their containers to a contracted depot or consolidation centres for full refund of deposit. Informal depots may arrange a share of handling fees, but this agreement would not involve Container Corporation.

Exhibit 1
Framework for evaluating cost, management and operational implications of container recovery systems



Notes: Retailers and licensees may elect to become contracted depots or informal depots.
**In some scenarios, beer distributors collect empties from LDB, LRS and licensees.*

Refillable soft drink bottles will be collected from contracted depots by soft drink bottlers. Consolidation centres will sort refillable beer bottles for return to brewers. Consolidation centres will also process waste materials for recycling through waste processors or for disposal in landfill until non-recyclable containers are phased out.

The responsibilities and activities of the elements of the network are described in more detail in section D below.

C. Containers and container materials

The eight different scenarios that we studied involved the recovery and processing of varying volumes of nine different types of containers:

Refillable beer (glass)
Refillable other (glass)
Non-refillable beer (glass)
Non-refillable other (glass)
Aluminum cans
Plastic bottles
Aseptic packs
Paper cartons (milk and juice)
Other (tin cans, boxed wines, etc.).

Each of the container types will be handled slightly differently, will have different handling costs, will have different waste material recovery revenues and costs and will therefore have different recovery charges.

Glass must be segregated by colour if the cullet is to be used in glass manufacture. Glass is expected to cost more to dispose of than it will bring in revenue, particularly in the case of green glass where a premium may need to be paid to find a market for all green cullet. Glass has other uses besides the remanufacture of bottles. It has been tested as road aggregate and glass, suitably ground, has been used for golf course sand traps. No alternative uses are expected to yield more revenue than transport and treatment costs. In summary, the costs of disposing of waste glass are expected to remain higher than the revenue that can be earned.

Aluminum has ready markets. Although prices are at historical lows, the value of aluminum is still significant in relation to the cost of container recovery.

Revenue for plastic can contribute noticeably to reducing container recovery costs as long as the plastic is suitably segregated. Material values could vary between 1.5¢ to 0.5¢ per container. Mixed plastic is virtually worthless. Adequate segregation at contracted depots is therefore very important. Aseptic packs are composed of a laminate of paper, metal, foil and plastic. The only significant use for these containers is in the production of "superwood." A processing plant has recently been opened in the Lower Mainland.

Paper cartons are made from a laminate of plastic and paper. Canada does not yet posses the processing facilities required to separate the laminate, but markets exist in Europe, the United States and Asia. The paper used for cartons is of very high quality. However, the cartons must be thoroughly rinsed before disposal because fermenting milk and juice causes degeneration of the paper fibres, significantly reducing the value of the scrap.

Other materials including tin cans and bag-in-box wines would generate insignificant volumes in comparison with other materials. These materials will be segregated at the contracted depot level. Container Corporation will dispose of them at minimum cost, either to a recycler or to a landfill. Eventually, the Ministry of Environment intends to ban the use of non-recyclable containers.

D. Elements of the system

1. Producers/distributors

Producers/distributors will own and control Container Corporation although the Minister of Environment will appoint directors to represent the public interest. Voting strength of producers/distributors will be partially proportionate to number and partially proportionate to value of recovery fees paid.

Producers/distributors may participate directly in the recovery system. Wineries that sell directly to the public may accept returned container for the products they sell. Breweries and soft drink bottlers that deliver beverages for onsite consumption (e.g., to restaurants and licensees) may pick up empties for drop off at consolidation centres.

Producers/distributors will contract with Container Corporation for the provision of all other recovery services. They must report sales and pay the legislated deposits and contracted fees to Container Corporation at intervals specified in the contracts. Their records may be audited by Container Corporation.

2. Contracted depots

Contracted depots are the first line of the organization. They serve the public and informal depots, and sort containers into their final categories with the exception of beer bottles. Containers will be categorized by size and by material (by resin for plastic and by colour for non-refillable glass). They must be sorted into about 15 groups. Contracted depots must maintain accurate records of receipts, deposits refunded, shipments and inventory. Container Corporation may audit the books and activities of contracted depots at any time. We recommend that contracted depots be required to stay open to the public for at least 30 hours per week, of which six must be on Saturday.

Soft drink bottlers will pick up their refillable bottles from contracted depots. Other containers will be collected regularly by transport scheduled by Container Corporation.

3. Consolidation centres

Consolidation centres accept containers from depots, informal depots, blue boxes and community groups. In the scenarios that incorporate beer, consolidation centres will also receive beer containers by PBD transport from licensees and LRS.

In brief, consolidation centres will:

- Maintain accurate records of containers received, deposits refunded, containers and waste materials shipped, and inventories.
- Carry out rigorous checks on containers received from contracted depots.
- Sort refillable beer bottles if this beverage is covered by the system.
- Bale aluminum, plastic, aseptic packs and paper cartons for sale (where relevant).
- Prepare glass for sale as specified by Container Corporation.

Consolidation centres can be audited at any time by Container Corporation.

4. Informal depots

Informal depots will exist to the extent that the consumer is prepared to support them. An informal depot may be an organization that accepts all container types for a discounted deposit. It may be a retailer that chooses to accept certain containers for full deposit refund in order to maintain traffic. Informal depots will receive no payment for services from Container Corporation. They can obtain full deposit refund by taking their containers to contracted depots, or to consolidation centres if they are adequately segregated.

5. Container Corporation Incorporated

Container Corporation is an accounting, administrative, control, policy making and management organization. It may own and operate a few depots to keep itself acquainted with depot operating cost structures. Container Corporation may also own and operate all or some consolidation centres, although we believe that private operation is preferable.

Container Corporation deals with and responds to the three groups: producers/distributors, depots and consolidation centres, and government. The Corporation's responsibilities are to identify container types based on cost

characteristics, estimate recovery charges to producers/distributors and sign contracts to recover containers on behalf of producers/distributors.

The Corporation specifies the reporting that it requires from producers/distributors, from depots, and from consolidation centres. To ensure the accuracy of reporting the Corporation will carry out audits as it sees fit.

The Corporation has the responsibility actively to promote beverage container recycling in the province and negotiate sales contracts for recyclable materials to maximize revenue for the industry.

Finally the Corporation must report recovery rates and financial performance regularly to its members (producers/distributors) and to government.

6. Blue box operators and community groups

Blue box operators will extract containers bearing a deposit, and return them to consolidation centres if they have segregated the containers, or to contracted depots if they have not. In return the blue box systems will receive full deposit.

In communities too small to justify a contracted depot, Container Corporation will encourage the establishment of community recycling initiatives.

7. Transport service

Depending on the scenario, up to four transport links are required:

- Return from licensee and LRS. We assume that PBD will collect empties from licensees and LRS on backhaul, delivering them to consolidation centres. This transport will not be a cost to the system and will not be included in beer bottle recovery costs. PBD, owned by Labatts and Molsons must be reimbursed for transporting import and other brewers' containers. The same opportunity could be extended to other producers/distributors that deliver to a destination for onsite consumption.

- Transport between contracted depots and consolidation centres. Container Corporation will negotiate transport rates and schedules throughout the province. We do not believe that Container Corporation needs to own and operate its own transport because common carriers can frequently provide backhaul rates. However, transport arrangements are operating decisions to be made by Container Corporation.

- Beer bottles to brewers. This service is presently provided by common carrier or by brewers' own transport. For those scenarios in which beer is covered by the system, we believe that existing transport arrangements and costs can be maintained.

- Transport of recyclable materials. Transport costs can be minimized by bulking waste materials at consolidation centres. Container Corporation will negotiate rates and services from common carriers.

8. The provincial government

The Ministry of Environment has no need to become physically involved in beverage container recycling. However, the Ministry must ensure that industry accepts its responsibilities by:

- Passing legislation defining the industry's responsibilities.
- Make regulations dealing with deposit levels and recovery rates.
- Monitoring Container Corporation service to producers/distributors and to consumers.

9. The role of reverse vending machines

Reverse vending machines are similar to regular vending machines except the consumer inserts a container and receives cash payment or a voucher for local redemption. Most machines are designed to identify acceptable containers by reading a bar code on the container. Some glass machines can be programmed to recognize the shape of acceptable bottles. Generally speaking, a separate machine is required for each container type to be segregated. Machines generally have restricted capacity for containers, even though some of them flatten aluminum cans, shred plastic and break bottles. In high volume sites the machines can be linked to storage silos with practically unlimited capacity.

The primary requirement for successful operation of the reverse vending machine is a bar code on container covered by legislation. A second requirement is a high volume of each container handled. One hundred thousand containers per month per machine is considered the breakeven volume. A third requirement is a host business to provide space and day-to-day servicing.

Reverse vending machines are used extensively in Scandinavia and California, and to some extent are used by Lower Mainland supermarkets for the return of aluminum soft drink cans.

Reverse vending machines are not universally welcomed by consumers. However, we believe that any potential contracted depot operator should be given the opportunity to offer such a service. He/she must overcome the problem of missing bar codes, must provide the required segregation of containers, and must convince Container Corporation of the integrity of machine records.

E. Container recovery cost structure

1. Basic assumptions

Unit recovery costs will, of course, vary with cost and productivity assumptions made. The most significant assumptions are the following:

- Wage rates.
- Gross rents.
- Number of depots.
- Number of consolidation centres.
- Productivity and cost levels from other systems and technical estimates.
- A built in profit on total costs and interest on investment for depots and consolidation centres.
- Assumed recovery rates of 95% for all beer bottles and for other refillable bottles, and 85% for all other containers. For preliminary unit cost calculations, all unredeemed deposits at these recovery rates are assumed to be available to reduce the cost of the system. In subsequent financial projections we consider the impact of some forfeited unredeemed deposits if recovery targets are not met.

2. Calculation of cost elements

The gross cost per container recovered includes the following fixed cost elements:

Depot costs
Transport to consolidation centres
Consolidation costs
Supplies
Refillable beer bottles to brewers
Container Corporation costs.

Costs for transport and supplies are constant for each container type in each scenario. Depot, consolidation centre and Container Corporation costs vary from scenario to scenario depending on volumes being handled.

Net recovery costs and gross recovery costs adjusted by the following:

Waste material transport costs
Waste material revenue (could be negative)
Unredeemed deposits.

For each scenario we calculated the cost of recovering each category of container through six sizes of depot, ranging from 2% of provincial volume down to 0.05%.

We also calculated the cost of processing containers through five sizes of consolidation centres, ranging from 12.5% down to 1% of provincial totals. The weighted depot and consolidation centre costs are calculated from the expected 221 depots of different sizes and the 15 consolidation centres of different sizes.

3. Unit recovery costs

Exhibit 2 summarizes the range of gross unit recovery costs calculated in the different scenarios. Of course, not every container appears in every scenario.

Costs are partly a function of weight and partly a function of volume. Aluminum cans are the cheapest container to recover. Glass is relatively expensive, particularly if it has to be sorted. Other light weight packs such as plastic, aseptic packs and paper cartons have costs that vary closely with the average volume of the container.

Exhibit 2
Range of estimated gross recovery costs—cents per container recovered

Container Type			Range, cents		
Refillable beer (full service)			5.79	to	5.97
Refillable beer (depot only)			3.55	to	3.64
Refillable other (depot only)			4.17	to	4.91
Non-refillable beer (sorted with refillables)			6.03	to	6.21
Non-refillable beer (no sorting)			3.52	to	3.72
Non-refillable other	-	1 litre and below	6.12	to	6.89
	-	Above 1 litre	6.42	to	7.20
Beer cans*			3.18	to	3.41
Other cans*			3.50	to	4.17
Plastic	-	1 litre and below	6.07	to	6.96
	-	Above 1 litre	8.87	to	10.10
Aseptic packs	-	1 litre and below	3.91	to	4.62
	-	Above 1 litre	8.11	to	9.33
Paper cartons	-	1 litre and below	4.41	to	5.19
	-	Above 1 litre	8.11	to	9.33

**Only 87% of beer cans, but 100% of other cans, incur depot costs. See text below.*

Beer containers cost somewhat less than other containers because 45% of bottles and 13% of beer cans are assumed to bypass depots. They would be delivered directly by PBD from licensees and LRS to consolidation centres. Non-refillable beer bottles cost more than refillable bottles because the additional costs of processing glass and disposing of it to remanufacturers at a loss.

Exhibit 3 summarizes the range of net recovery costs per container sold. The list of containers is somewhat shorter than in the previous exhibit which showed the simple estimate of recovery fees to be paid by producers/distributors for recovery services. In some of the scenarios Container Corporation charges represent only a portion of recovery costs to the producer/distributor. It would be misleading to net total recoveries against only a portion of recovery costs. The estimated costs shown are net of unredeemed deposits and are adjusted for material revenues or costs. The costs are further deflated to adjust between the net cost per container recovered and the net cost per container sold. Recovery rates are assumed to be 95% for all refillable bottles and for non-refillable beer, and 85% for all other containers.

Exhibit 3
Range of estimated net recovery costs—cents per container sold

Container Type			Range, cents		
Refillable beer (full service)			5.00	to	5.17
Non-refillable beer (sorted with refillables)			5.78	to	5.95
Non-refillable beer (no sorting)			3.40	to	3.59
Non-refillable other	-	1 litre and below	3.95	to	4.62
	-	Above 1 litre	3.60	to	4.29
Beer cans			(0.15)	to	0.04
Other cans			0.12	to	0.69
Plastic	-	1 litre and below	3.12	to	3.87
	-	Above 1 litre	3.90	to	4.93
Aseptic packs	-	1 litre and below	1.81	to	2.40
	-	Above 1 litre	3.86	to	4.90
Paper cartons	-	1 litre and below	2.24	to	2.89
	-	Above 1 litre	3.85	to	4.89

Net costs of glass bottles fall in the 4¢ to 5¢ range. The larger glass containers are cheaper because higher unredeemed deposits outweigh higher recovery costs. Net

can costs are very low because of the relatively high material value. Other containers have net costs approximately 2¢ lower than gross costs, primarily because of the value of un-redeemed deposits.

F. Financial evaluation

The first step in our analysis, described in section 2 above, calculated the unit recovery costs for each of the scenarios. We then used these costs to calculate income statements, balance sheets and cash flow projections for the first five years of Container Corporation's operations. The projections were based on assumed rising recovery rates from year 1 to year 5, as illustrated in Exhibit 4.

These projections assume a moderate reduction in recovery rates presently experienced for beer and soft drinks, as the new system is introduced. Completely new containers are expected to start with a low recovery rate reaching a peak within three or four years. Because of the higher deposit level, large containers are expected to have higher recovery rates than smaller containers.

1. Pooled unredeemed deposits

Normally, as recovery rates increase, unredeemed deposits fall, thus providing a disincentive to increase recovery rates. One way of reducing this disincentive is to pool all unredeemed deposits from all containers and to credit them to container categories in proportion to the number of containers actually recovered. Therefore a container type with high recovery rates will earn more credit than a container type with low recovery rates. The users of containers with lower return rates have an incentive to increase the return rates.

2. Total costs per container group are not expected to vary significantly between scenarios

Exhibit 5 summarizes total costs by container group for each scenario in the fifth year of operation. These costs represent Container Corporation charges to producers/distributors. They will be offset by savings in parts of the existing network.

Total costs for a specific container type are relatively constant in each scenario. Scenario A, being the smallest is the most expensive. Estimated costs per container type in other scenarios vary only when the total number of containers changes dramatically, or when the service being provided changes.

Exhibit 4
Assumed recovery rates

		Year 1	Year 2	Year 3	Year 4	Year 5
RF Beer	1 litre & below	85%	90%	95%	95%	95%
RF Other	1 litre & below	85%	90%	95%	95%	95%
NR Beer	1 litre & below	85%	90%	95%	95%	95%
NR Other	1 litre & below	65%	72%	80%	85%	90%
	Above 1 litre	75%	82%	90%	90%	90%
Al. Cans	1 litre & below	80%	85%	90%	90%	90%
Plastic	1 litre & below	65%	70%	75%	75%	75%
	Above 1 litre	75%	80%	90%	90%	90%
Aseptic Pack	1 litre & below	50%	65%	75%	75%	75%
	Above 1 litre	50%	75%	90%	90%	90%
Paper	1 litre & below	50%	65%	75%	75%	75%
	Above 1 litre	50%	75%	90%	90%	90%
Other	1 litre & below	50%	65%	75%	75%	75%
	Above 1 litre	50%	75%	90%	90%	90%

Exhibit 6 illustrates estimated net recovery costs by container type for the fifth year of operation. Gross costs are reduced by all unredeemed deposits, pooled and credited to container categories in proportion to recoveries (separate pools are assumed for containers up to 1 litre and above). Costs to producers or distributors will increase if the Ministry of Environment decides to retain some unredeemed deposits. Costs are also reduced by net revenues or costs related to waste material sales and transport. Again, costs per container type vary significantly only with changes in the number of containers or in the work done.

Exhibit 5
Estimated gross recovery costs by container type for year 5 ($ million)

Container type	Scenario A	B	B1	C	D	D1	E	F
Refillable beer	--	11.7	4.2	--	11.3	4.0	--	--
Refillable other	0.7	0.6	0.6	1.0	1.0	1.0	0.6	1.0
Non-refillable beer glass	--	1.2	0.4	--	1.1	0.4	0.7	0.7
Non-refillable other glass	12.5	11.6	11.8	11.6	11.4	11.6	11.6	11.3
Beer cans	--	10.6	10.9	--	10.2	10.3	10.8	10.2
Other cans	8.7	7.6	7.8	7.7	7.3	7.4	7.7	7.3
Plastic	4.4	4.4	4.6	5.7	5.8	5.9	4.2	5.6
Aseptic pack	1.2	1.1	1.1	2.4	2.3	2.3	1.1	2.3
Paper	0.2	0.2	0.2	8.0	7.9	8.0	0.2	7.8
Other	0.1	0.1	0.1	0.5	0.5	0.5	0.1	0.5
Total	27.8	49.1	41.7	37.1	58.8	51.4	37.0	46.7

Scenario A	Soft drink, bottled water, fruit drink, wine and liquor
Scenario B	Soft drink, bottled water, fruit drink, wine, liquor; beer, cider and cooler
Scenario B1	As for B, but all beer bottles collected from depots by PBD
Scenario C	Soft drink, bottled water, fruit drink, wine, liquor; juice and milk
Scenario D	Soft drink, bottled water, fruit drink, wine and liquor; beer, cider, cooler; juice and milk
Scenario D1	As for D, but all beer bottles collected from depots by PBD
Scenario E	Soft drink, bottled water, fruit drink, wine and liquor; NR beer glass and cans
Scenario F	Soft drink, bottled water, fruit drink, wine, liquor; juice and milk; NR beer glass and cans

Exhibit 6
Estimated net recovery costs by container type for year 5, with pooled unredeemed deposits ($ million)

Container type	Scenario A	B	B1	C	D	D1	E	F
Refillable beer	--	10.7	3.1	--	10.3	3.0	--	--
Refillable other	0.6	0.5	0.5	0.9	0.9	0.8	0.6	0.9
Non-refillable beer glass	--	1.0	0.2	--	0.9	0.1	0.6	0.5
Non-refillable other glass	10.7	10.0	10.3	9.2	9.4	9.5	10.0	9.3
Beer cans	--	1.7	2.0	--	0.4	0.5	1.8	0.4
Other cans	2.6	1.8	1.9	0.8	0.9	1.0	1.9	0.9
Plastic	3.2	3.0	3.2	3.8	3.9	4.0	2.9	3.7
Aseptic pack	0.9	0.8	0.8	1.4	1.4	1.5	0.8	1.4
Paper	0.1	0.1	0.1	5.5	5.5	5.7	0.1	5.4
Other	0.1	0.1	0.1	0.4	0.4	0.4	--	0.4
Total	18.2	29.7	22.2	22.0	34.0	26.5	18.7	22.9

Scenario A	Soft drink, bottled water, fruit drink, wine and liquor
Scenario B	Soft drink, bottled water, fruit drink, wine, liquor; beer, cider and cooler
Scenario B1	As for B, but all beer bottles collected from depots by PBD
Scenario C	Soft drink, bottled water, fruit drink, wine, liquor; juice and milk
Scenario D	Soft drink, bottled water, fruit drink, wine and liquor; beer, cider, cooler; juice and milk
Scenario D1	As for D, but all beer bottles collected from depots by PBD
Scenario E	Soft drink, bottled water, fruit drink, wine and liquor; NR beer glass and cans
Scenario F	Soft drink, bottled water, fruit drink, wine, liquor; juice and milk; NR beer glass and cans

3. Financial performance of Container Corporation

Start up costs for Container Corporation are estimated to amount to at least $750,000. However, this loss, together with operating losses in the first two years, are projected to be eliminated by the fifth year, even in Scenario A with the lowest volumes. Start up losses and initial working capital must be financed by short term debt. However, this is projected to have been paid off by the end of the first year in all scenarios. In summary, charges to producers/distributors are calculated to produce nominal net operating profits by the end of the first five years. In addition, interest on cash and trust funds (deposits and handling fees paid in advance) will contribute to paying off start up and early year losses. No cash crisis can be foreseen, as long as unredeemed deposits in early years are used for additional promotion costs and to redeem the containers on which no deposits were collected..

4. Sensitivity analysis

Unit costs and total costs will change as assumptions are changed. The most significant cost elements are depot and consolidation centre wages (35%-38% of total system costs), occupancy costs (18%) and other costs (15%). Changes to any of these costs would change total system costs according to the proportion each cost represents of the total.

G. Winners and losers

New container recovery systems will change recovery costs. New activities will incur costs. Unnecessary and cancelled activities will save costs. The introduction of an expanded deposit/refund system involving a network of universal container depots and consolidation centres will result in winners and losers for the following reasons:

- The parties enjoying the savings are generally not the same as the parties incurring additional costs.
- Quite possibly, the savings may not be passed on to the parties ultimately bearing the additional costs (probably consumers).
- Additional costs in total are likely to exceed savings.

1. Breweries will lose

Container Corporation fees for recovering beer containers will be higher than Pacific Brewers Distributors' costs. Total recovery costs for Pacific Brewers Distributors are confidential. However, the consultants have satisfied themselves that increased costs could amount to $10 million for all containers or $5 million for cans only. Producers must recover these costs, either through higher shelf prices to consumers or through lower margins to retailers. As well, brewers claim that they will face other potential costs for additional working capital and higher operating costs that might result from poorer service than they presently receive from PBD.

2. The Liquor Distribution Branch will win

The Liquor Distribution Branch calculates that wage costs for recovering containers average 1.35¢ each. Of this they assume that two-thirds, or 0.9¢ per container could be saved if LDB no longer accepted empties. This equates to savings of $3.6 million in the fifth year of scenario D. Over the longer term we would expect the LDB to save more than two-thirds of wage costs. As well, the wage cost of 1.35¢ per container calculated according to the LDB formula appears low in comparison to other depot systems. At an LDB saving of 1.5¢ per container—not an unrealistic figure—the saving could be as high as $6 million per year. The disposition of the savings is a policy issue.

3. Soft drink producers are likely to lose

Costs to soft drink producers are likely to increase because retailers presently meet the costs of empty container returns from within their margins. Container Corporation charges will exceed costs presently incurred by soft drink producers by an estimated $10 million. Producers must recover these costs, either through higher shelf prices to consumers or through lower margins to retailers. Because soft drinks, together with other beverages, are price sensitive, higher prices will result in lower sales volumes.

4. Retailers are likely to win

Retailers claim that they are not reimbursed for the costs of recovering empty containers, although soft drink producers believe that margins are adequate for this. Retailers will save wages and the cost of other supplies if all soft drink containers are returned through a network of depots. Over the past few years, retailers have reported recovery costs as falling between 5¢ and 20¢ per container, depending on the wage rate and container size. We believe a reasonable cost for wages and supplies is in the region of 2¢ per container. By year 5, savings to retailers would therefore fall around between $5 million. These savings can be distributed to producers in the form of higher prices, to consumers in the form of lower prices, or as additional profits to owners.

5. Producers of new beverages to be covered by deposit/refund legislation will lose

Because the producers of beverages not presently covered by deposit legislation bear no container recovery costs, they will lose if such costs are imposed.

Exhibit 7 illustrates that in scenario D, year 5, these costs are estimated to total $18.5 million. Estimated total weight is estimated at 75,300 tonnes which results in an average recovery cost $245 per tonne. Collection and landfill charges for containers now disposed of in the conventional waste stream costs in the region of $100-$130 per tonne. Blue box systems yield costs ranging from $190-$220 per tonne. Overall, recovery costs to the depot system are in the range of blue box systems.

Exhibit 7
Estimated gross container recovery costs for containers that are not covered by deposit legislation at present, Scenario D, year 5, with pooled unredeemed deposits

	Tonnes	Net Costs ($ million)	$ per tonne
NR glass (77%)	67,000	7.187	107
Other plastic (39%)	1,600	1.515	947
Aseptic packs	1,000	1.420	1,420
Paper cartons	5,200	5.530	1,063
Other	500	0.367	734
Total	75,300	16.019	213

Individually, recovery costs per tonne through the depot system vary widely. Non-refillable glass is expected to cost in the region of $114 per tonne to recycle. On the other hand, the cost of recovering aseptic packs exceeds $2,000 per tonne and the cost for paper cartons exceeds $1,000 per tonne. These last two costs appear very high. However, recovery costs per tonne through a blue box system would also be very high, because of the very light weight of individual containers.

Producers that might in future be covered by deposit legislation will have no alternative but to pass costs on to the consumer.

6. Municipalities will win

Municipalities will save money on every tonne of material that will no longer be recovered through a blue box or regular garbage collection system. The majority of the 75,000 tonnes referred to in Exhibit 7 is presently recovered in one of these two ways. We do not know the present split between blue box and landfill systems so we cannot estimate specific savings. However, at a net saving of $100 per tonne for collection and landfilling—not an unrealistic figure—municipalities would save $7.5 million per year. The difference between this figure and the estimated net $16.0 million system cost (assuming all unredeemed deposits are used to reduce costs) is the social price to be paid for extending landfill life and reducing landfill pollution.

7. Consumers will face some increased costs and inconvenience

The proposed universal container return system incorporates a network of between 200 and 250 contracted depots. Some consolidation centres may also choose to accept containers from consumers. Consumers will also have the opportunity of returning all containers to a number of informal depots, probably for a discount. As well, other businesses may choose to refund full or partial deposits for the beverages they sell. In some rural areas where contracted depots are uneconomic, we expect consumers to be serviced by community groups using container return as a method of fund raising.

Consumers presently buy beer, cider and coolers from a network of approximately 1,400 suppliers, including licensees and LRS. In practice, convenient return points for these containers number approximately 800. Soft drinks are sold through an estimated 3,600 outlets. While returns may be made at all outlets, in practice consumers use only the 2,600 food outlets. Wine and spirits are sold through some 600 outlets and water, milk and juices through 2,600 outlets. No deposit/refund system exists for these last three beverage types.

The proposed system will require the consumer to develop new shopping habits. The number of return points for beer, cider, coolers and soft drinks is significantly reduced. Potential benefits of this system include the establishment of a viable return system for wider range of containers. The consumer will be able to return all types covered by legislation to a single point. In due course, the consumer may also have the opportunity to return other recyclable materials to container depots. On the other hand, the consumer will no longer be able to return containers automatically when making a new purchase. Container depots will be less common than retailers and the consumer may have to go out of his/her way to return containers.

H. Implementation

We estimate that setting up and implementing a universal container recovery system will take a minimum of 14 months. The time is required to:

- Form the corporation, appoint staff and open offices.
- Negotiate requirements with Ministry of Environment.
- Specify accounting, control and operating procedures for depots and consolidation centres.
- Establish operating zones, request proposals from potential depot and consolidation centre operators, and issue contracts.

- Negotiate recyclable material sales.
- Plan the initial advertising and promotional campaign.
- Negotiate contracts for supplies.
- Plan the initial phase and supervise depot and consolidation centre preparations.
- Open up the system.